ERGIS Generators Working Group: April 25, 2013

The purpose of the phone call was to discuss how the ERGIS project will perform capacity planning (generator retirements and new builds) for the study year. Prior to discussion of this topic the working group discussed NREL's findings from completing action items from the previous generators working group call on April 8, 2013.

Review of Action Items from Working Group Call on April 8, 2013

The group discussed NREL's findings from examining the CEMS heat rate data. NREL examined the distribution of full-load heat rates from the CEMS data by generator type and capacity. The coal and gas boiler distributions show that the small units tend to have higher heat rates. Previous discussion had suggested that plants with high heat rates or small capacities would be likely candidates for retirement. This analysis suggests that many of these plants have both small capacity and high heat rates. The CEMS data for combined cycle units shows a bimodal distribution, with peaks at 7.5 and 11 MMBtu/MWh. The group concluded that many combined cycle units did not report the output of the steam cycle and therefore had unrealistically large heat rates. NREL combined the combined cycle data with the combustion turbine data and then separated the distribution into below 10 MMBtu/MWh (combined cycle units) and above 10 MMBtu/MWh (combustion turbines) and will apply these distributions to the generators in these categories in the Plexos database.

NREL examined GADS data for outage rates and durations and will apply the GADS data based on plant type and size.

NREL contacted Intertek APTECH to inquire if their methodology includes apportioning the long-term maintenance contract costs to the different categories of startup, variable O&M, and load following costs. APTECH does assign the cost of these contracts to the appropriate category based on terms of the contract.

NREL examined the Billion Ton Study produced by Oak Ridge National Laboratory and based on that study will assume a price for biomass fuel of $3.75/MMBtu.

NREL has delayed aggregating generator units or quantifying the effect of committing nuclear, hydro, wind, and solar units due to the fact that Energy Exemplar has promised an updated database for PLEXOS by Friday April 26. Once NREL receives the updated database the runtimes will be reevaluated and aggregation performed if it is deemed necessary to reduce runtimes. NREL has also upgraded a computer in the hopes that it will improve runtimes.

Capacity Planning

NREL presented the results of several forecasts of future generation fleet capacity. The 2013 Energy Information Agency (EIA) Annual Energy Outlook (AEO) compares five forecasts of United States fleet composition in 2025, which indicate that total coal-fired capacity will decrease by 33–73 GW and total oil- and gas-fired capacity will increase by 37–105 GW. NREL also presented the results of the EIPC

capacity study, which had three different scenarios. In the two scenarios without a carbon constraint, the EIPC suggests that coal-fired capacity will decrease by about 50 GW in the Eastern Interconnect by 2020 and that gas-fired capacity will increase by about the same amount. NREL also examined a Brattle Group study that projects 57–73 GW of coal retirements in the Eastern Interconnect by 2016 due to low natural gas prices and environmental regulations.

It was brought to the group's attention that MISO had performed a study and projected 40–60 GW of coal capacity retirements in the EI.

After presentation of these forecasts the group discussed possible approaches for ERGIS could take towards quantifying future operational capacity.

The group discussed leaving all the plants in place, running PLEXOS iteratively, and retiring plants with capacity factors below a certain threshold. One variant on this approach would be to incrementally replace coal capacity with gas capacity and see how the results change. One way of reducing the time required for this process is to choose specific months for analysis rather than the entire year. However in many (or most) cases environmental regulations will drive retirements and these regulations are not currently captured in the PLEXOS database (although PLEXOS does have the capability to model them).

The group also discussed using the using the PLEXOS capacity-planning feature to perform capacity planning for ERGIS. As mentioned above, PLEXOS does have the ability to model retirements due to environmental regulations, but the EI database currently does not have the data needed to consider retirements due to environmental regulations.

The group discussed the fact that there is EIA data for announced retirements by region and year. NREL could refer to these data during the capacity planning process.

The group discussed analyzing the EIA AEO scenarios, selecting a scenario that seems reasonable for the conditions ERGIS is attempting to simulate, and implementing the generator build-out predicted by that scenario.

The group agreed that coal retirements should be held to reasonable levels (on the low end of the estimates) so that the fleet assumption doesn't drive the study findings too far one way or another. 40–60 GW was mentioned as a reasonable range for coal retirements.

The group agreed that replacement and expansion capacity should be gas-fired, and that it should not be a one-for-one replacement of the retirements without consideration of the renewable generation fleet.

The group discussed the fact that a Brattle study found that coal unit retirements were very sensitive to changes in the price of natural gas. A $1/MMBtu increase or decrease from the baseline natural gas price caused large changes in the amount of coal capacity that was retired.

The group suggested that the adequacy of the gas delivery infrastructure be considered during analysis of the results, particularly with respect to the New England states and changes in the volatility and magnitudes of daily use patterns.

The group was of different opinions on whether the non-wind, non-solar generation fleet should be similar between the scenarios or whether it should be held constant. The argument for holding the non-wind non-solar fleet constant is that it isolates the impact of changing the wind and solar fleet. The argument for changing the non-wind non-solar fleet is that the ERGIS levels of wind and solar penetration would have a substantial impact on the fleet composition, and ignoring that impact would result in a fleet that would not occur in reality.

Overall there was general agreement that a capacity planning margin of 15% should be maintained. Wind and solar should be given their appropriate capacity values based on their penetration levels.

The group briefly discussed the question of transmission expansion. Transmission expansion will be the topic of working group discussions during May, and interested individuals were invited to join that working group.

The group ended the call without reaching a conclusion about how ERGIS should perform capacity planning for the study year. NREL will look into the topics discussed above and another working group call will be scheduled for a date in May.

Conference Call Attendees:

Jordan Bakke	MISO
Venkat Banunarayanan	DOE
John Black	ISO-NE
Aaron Bloom	NREL
Greg Brinkman	NREL
Wayne Coste	ISO-NE
Erich Eschmann	EPA
Stan Hadley	ORNL
Gary Jordan	NREL Contractor
Jack King	NREL Contractor
Patrick Sullivan	NREL
Aaron Townsend	NREL
Yih-huei Wan	NREL